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Your file - Votre reference

Our file - Notre référence
NWB3CAP0207

October 6, 2003

Art Stewart
Senior Administrative Officer (SAO)
Hamlet of Cape Dorset
Cape Dorset, NU X0A 0C0
Ph: 867 897-8943
Fax: 867 897-8030

Re: July 21, 2003 Municipal Water Licence Inspection

I would like to thank the SAO, Art Stewart and Hamlet Foreman, Leon Nason for their time and assistance during the Hamlet of Cape Dorset Water Licence Inspection. We were required to work well past 5:00 pm and their patience and cooperation was greatly appreciated.

In the course of the inspection a number of concerns were identified relating to the Hamlet's sewage treatment and solid waste disposal. The potable water for the community is well monitored and the chlorination system is well maintained.

Water Supply (Cap-1)

In order to eliminate difficulties experienced with the pipeline between Tee Lake and the pumphouse (figure 1) a contractor was hired to build a replacement/back up pipeline. The new pipeline is now in place, however, Mr Nason expressed concern that the lack of galvanized hinges, exposed wires and inadequate allowance for shifting of the pipeline could significantly reduce its useful life. He felt that addressing these problems would greatly increase the longevity and functionality of the new pipeline.

Mr Nason took us to Tee Lake, the source of freshwater in Cape Dorset, where we discussed methods for protecting Tee lake from anthropogenic contamination. To this end, Mr Nason committed to remove garbage and old piping from the edge of Tee lake as well as to put up signage identifying Tee Lake as the freshwater source for the Hamlet of Cape Dorset.

Analysis of water samples from Tee Lake provided results within Guidelines for Canadian Drinking Water Quality, however the turbidity of the potable water in Tee Lake is equal to the Maximum Allowable Concentration according to the Guidelines for Canadian Drinking Water Quality (1.0 mg/l). High turbidity values

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are a concern because they may reduce the effectiveness of chlorination in eliminating microbes harmful to human health.

The pumphouse and chlorination system are well maintained and Mr Nason is committed to maintaining daily records of water use and chlorine residual concentration in the water supply.

Solid waste disposal:
Metal Dump (CAP2)
The current state of the metal dump is unacceptable. There is no segregation of materials at the site (figure 6) and no containment of hazardous materials. Tires, solvent containers, dead animals and used 12V batteries were all visible at the site. No measures are in place to prevent contaminated runoff from flowing into Telik Inlet and water was visible seeping out of the metal dump. A sample of the seep was taken at coordinates N 64°13'36.1" W076°34'19.6" and preliminary results are attached to this report.

According to results obtained from Taiga Laboratory in Yellowknife; Iron, with a concentration of 2253ug/L is much greater than the Canadian Environmental Quality Guideline for the Protection of Freshwater Aquatic Life (CEQGPAL, 300ug/L) but no guideline has yet been developed for Marine Aquatic Life. Phenols were measured at a concentration of 7.4 ug/l which also exceeds the Canadian Environmental Quality Guideline for the Protection of Freshwater Aquatic Life (4ug/l). The remainder of parameters measured were within Canadian Guidelines.

Art Stewart indicated that the metal dump is scheduled for clean up in the early fall of 2003. A clean up of the metal waste disposal sight should include segregation of materials, containment of hazardous waste, diversion of run-off and containment of precipitation to prevent contamination of Telik Inlet.

Burn and Bury Landfill
There is a significant amount of runoff passing through the landfill. This runoff along with precipitation, needs to be contained to ensure it does not carry contaminants into Telik Inlet. Currently, water running off the hills passes directly through the landfill before it continues on toward the Inlet. Signage needs to be put up identifying the landfill site and a fence needs to be built around the landfill to help contain waste.

Sewage Disposal (CAP3)
Single Cell Lagoon
The old single celled sewage lagoon was brought back into service because of the problems with the 3-celled sewage lagoon. However, there is a serious leak in the old lagoon and it's capacity is not sufficient to support the community. In an

effort to increase the lagoons retention time the municipality placed a row of three berms at the bottom of the lagoon between the leaking lagoon and Telik Inlet (figure 3). The berms have created some ponding and it is possible that they improve the quality of the sewage effluent before it reaches Telik Inlet but it is obviously not an acceptable solution to the problem. Water observed running into Telik Inlet is greyish and foamy with a noticeable odour. A considerable amount of algae is visible in the stream and grass is growing quite thickly below the berms almost all the way to Telik Inlet. The increased plant and algae growth is consistent with high nutrient content consistent with sewage effluent. Constantine Bodykevich advised Art Stewart that the flow needs to be stopped or at the very least, reduced significantly.

3-Cell Lagoon

The municipality has attempted to repair the three cell sewage lagoon but so far the repairs have not been effective (figure 4). There is a small leak from Cell one along the road which then flows into cell two from the northeast side. There is also a ditch on the opposite side of cell two that runs from an overflow culvert in cell one, parallel to cells two and three, before flowing down to Telik Inlet. There was only a slight trickle of water originating in the landfill but if cell one were operating effluent would run directly from cell one into Telik Inlet. According to Art Stewart the overflow culvert was designed to run into cell two but it did not appear to be working properly. Repairs on the berm and overflow culvert between cells two and three appeared to be near completion but the berm was still quite unconsolidated and I suspect that spring runoff will likely wash it away again.

Repairs have also been attempted on the final berm in cell three but effluent was still visible flowing from beneath the final berm into Telik Inlet. The Municipal Engineer, Sameh Elsayed suggested that the rapidly flowing water below cell three may be a result of an underground spring. This did not appear to be the case however, as the water was quite grey and foamy with algal growth on the rocks and a very strong odour that I would associate with sewage effluent.

Analysis performed by Taiga Laboratory in Yellowknife showed the water running below the final berm of the sewage lagoon to have some characteristics consistent with primary sewage effluent (Environment Canada website). The effluent was within the parameters of the water licence for the parameters tested but it is notable that time constraints prevented analysis for BOD and Fecal Coliforms, both required parameters in the water licence. Samples of the outflow showed that it was quite high in Cadmium 0.1ug/l (Canadian Water Quality Guidelines for the Protection of Aquatic Life of 0.12 ug/l) and Iron 6210 ug/l (no guideline) but Ammonia -Nitrogen (17.4 mg/l) and Phosphorous were quite low.

Non-compliance of the Act:
The municipality is aware that the current state of sewage treatment in the community is unacceptable. A comparison of the relative advantages of a mechanical treatment plant and a new sewage lagoon suggests that the three cell lagoon will be in service for at least another two years (Dillon Consulting 2003). The latest lagoon was improperly designed or constructed and the result has been a relatively constant discharge of sewage effluent into Telik Inlet. In addition, the old lagoon has been brought back into use and it does not have sufficient retention time or capacity to adequately treat the communities sewage.

As per the Water Licence issued to the Hamlet of Cape Dorset September 1, 2002; the Hamlet must provide an Operation and Maintenance Manual for operating and maintaining waste disposal sites. The Hamlet must also maintain, with appropriate signage, a Surveillance Network Program (SNP) involving monthly sampling of CAP-2 and CAP-3 between May 1 and August 31. The Hamlet of Cape Dorset must also develop a Quality Assurance/ Quality Control Plan to ensure that samples taken as part of the SNP maintain a high quality. Development of a new sewage treatment facility or simply decommissioning of the original sewage lagoon will require an Abandonment and Restoration Plan. As of yet, the Hamlet of Cape Dorset has not met these requirements.

I would also like to remind the licensee that an annual report providing detailed information on municipal activities pertaining to the Water Licence, must be provided to the Nunavut Water Board by March 31, 2004. Please find the outline for the annual report attached to this document.

Although the Hamlets main priority must be to ensure adequate sewage treatment for the community, I expect that the other outstanding requirements of the Water Licence will also be addressed. If you have any questions or concerns, please feel free to contact me.

Sincerely,

Scott Stewart

Scott Stewart
Water Resource Officer
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stewarts@inac.gc.ca

References

Dillon Consulting. 2003. *Government of Nunavut Sewage Treatment Alternatives for the Hamlet of Cape Dorset, Nunavut.* Dillon Consulting Limited #2450, 101-6th Avenue SW Calgary, Alberta T2P 3P4.

Environment Canada website
http://www.ec.gc.ca/soer-ree/English/soer/MWWE1.cfm
Municipal Wastewater Effluents: What they are and what they contain. Url accessed October 1, 2003.

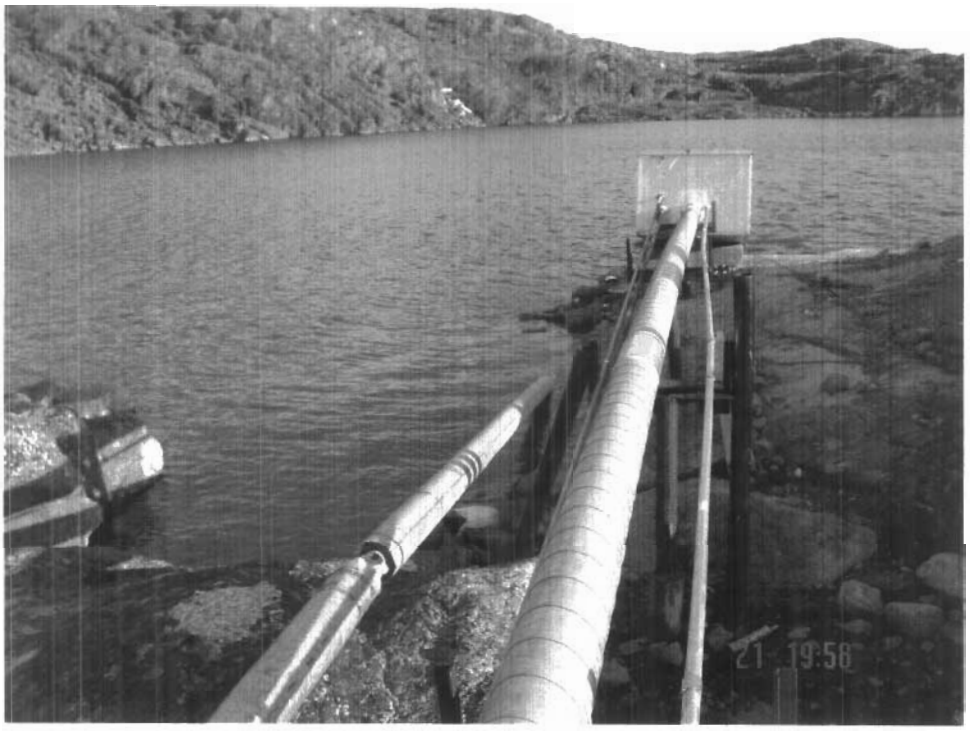

Figure 1.Cape Dorset pipeline running from Tee Lake to the municipal pumphouse.

Figure 2. Chlorination system at the Cape Dorset pumphouse.

Figure 3. Berms placed between the old sewage lagoon in Cape Dorset and Telik Inlet to increase the lagoons "retention time".

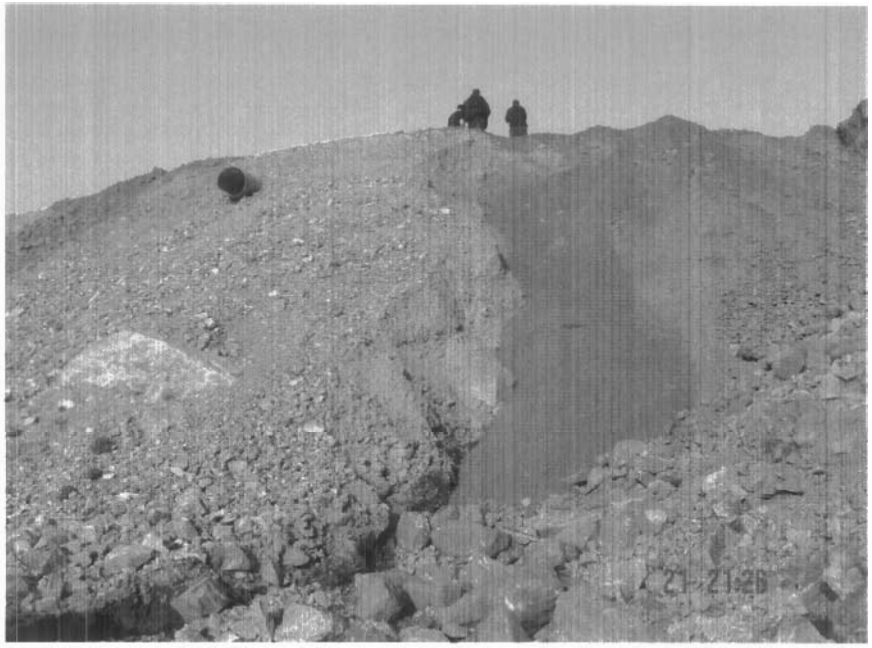

Figure 4. Attempted repairs to the 3rd cell in the Cape Dorset sewage lagoon.

Figure 5. Flow observed below the 3rd cell in the Cape Dorset sewage lagoon.

Figure 6. Unsegregated materials visible in the Cape Dorset Metal dump.

Figure 7. Runoff passing through the Cape Dorset landfill.

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MUNICIPAL WATER USE INSPECTION REPORT

Date: July 21, 2003 **Licensee Rep.** (Name/Title)**:** SAO/Art Stewart

Licensee: Hamlet of Cape Dorset **Licence No.:**NWB3CAP0207

WATER SUPPLY

Source(s): Tee Lake **Quantity used: Unknown**

Owner:/Operator: Municipality

Indicate: **A** - Acceptable **U** - Unacceptable **NA** - Not Applicable **NI** - Not Inspected

Intake Facilities: A **Storage Structure:**A **Treatment Systems:**A **Chemical Storage:**A

Flow Meas. Device:NI **Conveyance Lines:**A **Pumping Stations:**NI

Comments: Leon Nason is keeping records of chlorine residual and will begin recording the volume of water distributed to the community. Mr Nason expressed some concern about exposed wiring, hinge construction and pipeline durability/flexibility.

WASTE DISPOSAL

Sewage: **Sewage Treatment System** (Prim./Sec/Ter.)**:Primary**

Natural Water Body: **Continuous Discharge** (land or water)**:**

Seasonal Discharge: Overland to Ocean **Wetlands Treatment:** Nil **Trench:**None

Solid Waste: **Owner/Operator:**

Landfill: **Burn & Landfill:** x **Other:**

Indicate: **A** - Acceptable **U** - Unacceptable **NA** - Not Applicable **NI** - Not Inspected

Discharge Quality: NA **Decant Structure:** NA **Erosion:**U

Discharge Meas. Device: NA **Dyke Inspection:**U **Seepages:**U

Dams, Dykes: NA **Freeboard:**U **Spills:**U

Construction:NA **O&M Plan:**U **A&R Plan:**NI

Periods of Discharge:NA **Effluent Discharge Rate:**U

Comments: Neither of the sewage lagoons are working properly. The new 3 cell lagoon leaks and is prone to erosion and the old single cell lagoon has insufficient capacity and minimal retention time. The metal dump and landfill are not segregated and precipitation and seepage are not contained. Hazardous materials are not contained, there is no signage identifying waste disposal sites and the landfill is not fenced.

FUEL STORAGE:

Not Inspected

Waste Oil Storage

Owner/Operator: Hamlet of Cape Dorset

Indicate: **A** - Acceptable **U** - Unacceptable **NA** - Not Applicable **NI** - Not Inspected

Berms & Liners:U **Water within Berms:** NI **Evidence of Leaks:** Waste oil visible on ground

Drainage Pipes:NA **Pump Station & Catchment Berm:**NI

Pipeline Condition:NA **Not Applicable:** **Condition of Tanks:**

Waste oil had built up around the wharehouse as the oilburner was not functioning properly. Oil was visible in the soil around the drums.

SURVEILLANCE NETWORK PROGRAM (SNP)

Samples Collected **Hamlet:**None

INAC: Effluent below 3 cell lagoon, seep/ metal dump, Tee lake

Signs Posted **SNP:**None **Warning:**None

Records & Reporting: Adequate records at pumphouse with exception of water use

Geotechnical Inspection:NI

Non-Compliance of Act or Licence:

Sewage treatment facility unacceptable. As per the water licence issued to the Hamlet of Cape Dorset September 1, 2002; the Hamlet must provide an Operation and Maintenance Manual for operating waste disposal sites. The Hamlet must also maintain, with appropriate signage, a Surveillance Network Program (SNP) and develop a Quality Assurance/ Quality Control Plan to ensure that samples taken as part of the SNP maintain a high quality. As of yet, the Hamlet of Cape Dorset has not met these requirements. Although the Hamlets main priority must be to ensure adequate sewage treatment for the community I expect that these outstanding requirements of the water licence will also be met.

Scott Stewart
Inspector's Name

Scott Stewart
Inspector's Signature

Taiga Environmental Laboratory
4601-52nd Ave., Box 1500, Yellowknife, NT. X1A 2R3
Tel: (867)-669-2788
Fax: (867)-669-2718

- CERTIFICATE OF ANALYSIS -

Prepared For: DIAND Nunavut District Office *Attn:* Constantine Bodykevi

Sample ID: Pot CAP-1 **Taiga Sample ID:** 232263

Client Project: **Sample Type:** potable water **Received Date:** 24-Jul-03

Location: CAPE DORSET NU **Sampling Date:** 21-Jul-03

Report Status: **Preliminary** ***Approved by:***

Test Parameter	Result	Units	Detection Limit	Analysis Date	Data Qualifier
Physicals					
Alkalinity	8.3	mg/L	0.3	29-Jul-03	
Colour	<5		5	24-Jul-03	
Conductivity, Specific	46.0	µS/cm	0.3	29-Jul-03	
pH	6.91	pH units	0.05	29-Jul-03	
Solids, Total Suspended	<3	mg/L	3	28-Jul-03	
Turbidity	1.0	NTU	0.1	31-Jul-03	
Nutrients					
Ammonia as N	<0.005	mg/L	0.005	31-Jul-03	
Nitrate+Nitrite as N	<0.008	mg/L	0.008	05-Aug-03	
Phosphorous, Total	0.002	mg/L	0.002	31-Jul-03	
Major Ions					
Calcium	2.52	mg/L	0.05	24-Jul-03	
Chloride	6.6	mg/L	0.2	25-Jul-03	
Fluoride	<0.03	mg/L	0.03	05-Aug-03	
Hardness as CaCO3	9.01	mg/L	0.17	24-Jul-03	
Magnesium	0.66	mg/L	0.02	24-Jul-03	
Potassium	0.29	mg/L	0.03	24-Jul-03	
Silica, Reactive	0.18	mg/L	0.02	11-Aug-03	

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- CERTIFICATE OF ANALYSIS -

Prepared For: DIAND Nunavut District Office *Attn:* Constantine Bodykevi

Sample ID: Pot CAP-1 **Taiga Sample ID:** 232263

Sodium	3.74	mg/L	0.02	24-Jul-03
Sulphate	<3	mg/L	3	01-Aug-03
Metals, Total				
Arsenic	<1	µg/L	1	24-Jul-03
Iron	<30	µg/L	30	18-Aug-03
Mercury	<0.01	µg/L	0.01	16-Aug-03

Data Qualifier Descriptions:

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- CERTIFICATE OF ANALYSIS -

Prepared For: DIAND Nunavut District Office *Attn:* Constantine Bodykevi

Sample ID: CAP-2 **Taiga Sample ID:** 232264

Client Project: **Sample Type:** matrix unknown **Received Date:** 24-Jul-03

Location: CAPE DORSET, NU **Sampling Date:** 21-Jul-03

Report Status: Preliminary ***Approved by:*** _____

Test Parameter	Result	Units	Detection Limit	Analysis Date	Data Qualifier
Physicals					
Alkalinity	103	mg/L	0.3	29-Jul-03	
Colour	5		5	24-Jul-03	
Conductivity, Specific	599	µS/cm	0.3	29-Jul-03	
pH	8.24	pH units	0.05	29-Jul-03	
Solids, Total Suspended	10	mg/L	3	28-Jul-03	
Turbidity	8.6	NTU	0.1	31-Jul-03	
Nutrients					
Ammonia as N	0.007	mg/L	0.005	31-Jul-03	
Nitrate+Nitrite as N	0.585	mg/L	0.008	05-Aug-03	
Phosphorous, Total	0.035	mg/L	0.002	31-Jul-03	
Major Ions					
Calcium	26.2	mg/L	0.05	24-Jul-03	
Chloride	61.5	mg/L	0.2	25-Jul-03	
Fluoride	0.39	mg/L	0.03	05-Aug-03	
Hardness as CaCO3	135	mg/L	0.17	24-Jul-03	
Magnesium	16.8	mg/L	0.02	24-Jul-03	
Potassium	6.83	mg/L	0.03	24-Jul-03	
Silica, Reactive	0.58	mg/L	0.02	11-Aug-03	

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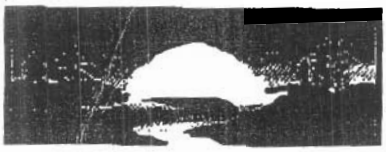
- CERTIFICATE OF ANALYSIS -

Prepared For: DIAND Nunavut District Office *Attn:* Constantine Bodykevi

Sample ID: CAP-2 **Taiga Sample ID:** 232264

	Sodium	52.9	mg/L	0.02	24-Jul-03
	Sulphate	68	mg/L	3	01-Aug-03
Metals, Total					
	Arsenic	2	µg/L	1	29-Jul-03
	Iron	2253	µg/L	30	31-Jul-03
	Mercury	< 0.01	µg/L	0.01	16-Aug-03
Subcontracted Organics					
	Phenols	7.4	µg/L	0.5	07-Aug-03

Data Qualifier Descriptions:



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- CERTIFICATE OF ANALYSIS -

Prepared For: DIAND Nunavut District Office *Attn:* Constantine Bodykevi

Sample ID: CAP-3 **Taiga Sample ID:** 232265

Client Project: **Sample Type:** sewage **Received Date:** 24-Jul-03

Location: cape dorset, nu **Sampling Date:** 21-Jul-03

Report Status: Preliminary ***Approved by:*** _____

Test Parameter	Result	Units	Detection Limit	Analysis Date	Data Qualifier
Physicals					
Alkalinity	153	mg/L	0.3	29-Jul-03	
Colour	120		5	24-Jul-03	
Conductivity, Specific	743	µS/cm	0.3	29-Jul-03	
pH	7.62	pH units	0.05	29-Jul-03	
Solids, Total Suspended	62	mg/L	3	28-Jul-03	
Turbidity -	112	NTU	0.1	31-Jul-03	
Nutrients					
Ammonia as N	17.4	mg/L	0.005	31-Jul-03	
Chemical Oxygen Demand	40	mg/L	1	08-Aug-03	
Nitrate+Nitrite as N	0.474	mg/L	0.008	05-Aug-03	
Phosphorous, Total	0.685	mg/L	0.002	31-Jul-03	
Major Ions					
Calcium	35.9	mg/L	0.05	24-Jul-03	
Chloride	36.8	mg/L	0.2	25-Jul-03	
Fluoride		mg/L			14
Hardness as CaCO3	137	mg/L	0.17	24-Jul-03	
Magnesium	11.6	mg/L	0.02	24-Jul-03	
Potassium	10.3	mg/L	0.03	24-Jul-03	

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- CERTIFICATE OF ANALYSIS -

Prepared For: DIAND Nunavut District Office *Attn:* Constantine Bodykevi

Sample ID: CAP-3 **Taiga Sample ID:** 232265

Silica, Reactive	4.64	mg/L	0.02	11-Aug-03
Sodium	47.4	mg/L	0.02	24-Jul-03
Sulphate	141	mg/L	3	28-Jul-03
Metals, Total				
Arsenic	8	µg/L	1	29-Jul-03
Cadmium	0.1	µg/L	0.1	18-Aug-03
Chromium	5.6	µg/L	0.3	18-Aug-03
Cobalt	9.0	µg/L	0.1	18-Aug-03
Copper	11.6	µg/L	0.2	18-Aug-03
Iron	6210	µg/L	30	31-Jul-03
Lead	3.1	µg/L	0.1	18-Aug-03
Manganese	1740	µg/L	0.1	18-Aug-03
Nickel	20.4	µg/L	0.1	18-Aug-03
Zinc	18	µg/L	10	18-Aug-03

Data Qualifier Descriptions:

14 *Insufficient sample to perform analysis*